Assessing and reducing the risk of ground-water contamination from

Drinking Water Well Condition

Keeping Idaho's Water Clean

Fact/Worksheet 1

Why should I be concerned?

About 90 percent of this country's rural residents use ground water to supply their drinking water and homestead needs. Wells generally provide clean, safe water. If improperly located, constructed, or maintained, however, they can allow bacteria, pesticides, fertilizer, or oil products to contaminate ground water. These contaminants can put family and animal health at risk.

There are many documented cases of well contamination originating from homestead activities near drinking water wells. The condition of your well and its location in relation to contamination sources determine the risk it poses to the water you drink. For example, a cracked well casing may allow bacteria, nitrates, oil, and pesticides to enter the well. A spill of pesticides being mixed and loaded near the well could result in a serious contamination of your family's drinking water supply. Feedlots, septic systems, fertilizer applications, and waste storage areas can release large amounts of contaminants which may affect your well.

Preventing well water contamination is very important, and once the ground water supplying your well is contaminated, it is very difficult to clean up. The only options may be to treat the water, drill a new well, or obtain water from another source. A contaminated well can also affect surrounding wells, posing a serious health threat to others.

The goal of Home*A*Syst is to help you protect the environment and your drinking water.

How will these materials help me to protect my drinking water?

- It will take you step-by-step through your drinking water well condition and management practices.
- It will rank your activities according to how they might affect the ground water that provides your drinking water supply.
- It will provide you with easy-to-understand rankings that will help you analyze the "risk level" of your drinking water well condition and management practices.
- It will help you determine which of your practices are reasonably safe and effective, and which practices might require modification to better protect your drinking water.

How do I complete the worksheet?

After reviewing the information provided, follow the directions at the top of the chart on page 12. It should take you about 15 to 30 minutes to complete the worksheet and summarize your risk rankings.

Focus on the well that provides drinking water for your homestead. If you have more than one drinking water well on your homestead, fill out a worksheet for each one.

Glossary

Drinking Water Well Condition

These terms may help you make more accurate assessments when completing Fact/Worksheet 1. They may also help clarify some of the terms used.

Abandoned water well: A well which has been filled or plugged so that it is rendered unproductive and will prevent contamination of the ground water. A properly abandoned well will not produce water nor serve as a channel for movement through the well or between water bearing zones. Wells that are not used should be properly abandoned as soon as possible.

Air gap: An air space (open space) between the hose or faucet and water level. It is one way to prevent backflow of liquids into a well or water supply.

Anti-backflow (anti-backsiphoning) device: A check valve or other mechanical device to prevent unwanted reverse flow of liquids back down a water supply pipe into a well.

Aquifer: An underground formation of rock or sediments containing and capable of supplying ground water.

Backflow: The unwanted reverse flow of liquids in a piping system.

Backsiphonage: Backflow caused by formation of a vacuum in a water supply pipe.

Casing: Steel pipe installed while drilling a well, to prevent collapse of the well borehole, entrance of contaminants, and to allow placement of pumping equipment.

Cross-connection: A link or channel between pipes, wells, fixtures, or tanks carrying contaminated water and those carrying potable (safe for drinking) water. Contaminated water can enter the potable water system if it is under higher pressure.

Drilled wells: Any drilled excavation that is constructed with the intended use of for the location, diversion, artificial recharge, observation, monitoring, de-watering, or withdrawal of ground water.

Driven-point (sand point) wells: Wells that are constructed by driving assembled lengths of pipe into the ground with percussion equipment or by hand. These wells are usually small in diameter (two inches or less), less than 50 feet deep, and installed in areas of relatively loose soils, such as sand.

Dug wells: Large-diameter, relatively shallow wells lined with rock, brick, or concrete and often hand constructed. Typical dug wells are three to six feet in diameter and 15 to 50 feet deep.

Ground water: Subsurface water in soil, rock or sediment.

Grout: A fluid mixture of cement, bentonite, and water which is used to seal the space between the borehole and casing, or to properly fill and seal abandoned wells.

Milligrams per liter (mg/L): The weight of a substance measured in milligrams contained in one liter. It is equivalent to 1 part per million.

Glossary

Drinking Water Well Condition

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Parts per million (ppm): A measurement of concentration of one unit of material dispersed in one million units of another.

Pitless adapter: An assembly placed below the frost line which permits pumped well water to pass through the casing without allowing contaminants to enter.

Unused well: A well that is unused, unmaintained, and/or is in disrepair. An unused well should be properly abandoned as soon as possible.

Water table: The upper level of ground water in the unconfined zone saturated with water. It fluctuates with climatic conditions on land surface, and with aquifer discharge and recharge rates.

Well cap: A manufactured device installed at the top of a well casing which creates an air and watertight sanitary seal to prevent surface water and contaminants from gaining access to the ground water supply.

Improving Drinking Water Well Condition

Keeping Idaho's Water Clean

This materials set addresses well conditions for non-public drinking water systems. What is a non-public drinking water system? In Idaho, there are two types of water systems: public and non-public. A public water system serves at least 15 connections or at least 25 individuals daily for at least 60 days of the year and is regulated by the Idaho Department of Health and Welfare-Division of Environmental Quality (IDHW-DEQ). All other drinking water systems are considered to be non-public, and the day-to-day operation of these wells is not regulated. These wells, however, have minimum construction standards that are regulated by the Idaho Department of Water Resources (IDWR).

The design, construction, and operation of a well can significantly impact water quality. Thus, it is important to consider actions now to prevent the contamination of your drinking water supplies for today and for the future.

1. Well location

Whether a well taps water just below the ground surface or hundreds of feet deep, its location at the ground surface is a crucial safety factor. Locating a well in a safe place takes careful planning and consideration of factors such as where the well is located in relation to surface drainage and ground-water flow. A well down-slope from an animal feedlot, a leaking fuel tank, or a failing septic system runs a greater risk of contamination than a well on the uphill side of these pollution sources. The general rule for protecting the water supply is to **keep a well up-slope and as far as possible from potential sources of contamination.**

Surface slope does not always indicate the direction a pollutant might flow once it gets into the ground. In shallow aquifers, ground-water flow is usually in the same direction as surface water flow. However, if the aquifer supplying water to your well is deep below the surface, its direction of ground-water flow may be different than that of surface water flow.

Separation distances

Many states encourage good well location by requiring minimum separation distances from sources of potential pollution, thus using the natural protection provided by soil. IDWR Well Construction Standards Rules (25.01.a.) requires that constructed wells must meet all siting and distance requirements set forth by the appropriate public health districts and Idaho Department of Health and Welfare rules. **In many Idaho counties, the local public health district or planning and zoning department may have specific regulations requiring greater separation from some potential contamination sources.**

There is no specific distance that will guarantee that the well will not be affected. Make every effort, however, to always provide as much separation as possible between your well and any potential contamination source(s).

Both soil type and slope can make siting a well tricky business. Keep in mind that separation distances listed by the state are minimums. You may want to choose greater separation distances in some cases, depending on factors at your well site. All surface runoff should be diverted away from the well. Be sure to consider possible contamination sources on adjacent properties as well.

Changing the location of contamination sources in relation to your well may protect your water supply, but not the ground water itself. Any condition likely to cause ground-water contamination should be improved, even if your well is far away from the potential source. Whether or not drinking water is affected, ground-water contamination is a violation of Idaho law.

Simply separating your well from a contamination source may reduce the chance of contamination, but it does not guarantee that the well will be safe. For example, stormwater can transport bacteria, oil products, and pesticides which can wash into an improperly constructed well. Also, wells can become impaired by contaminated water recharging the aquifer from a considerable distance, depending on the depth of the aquifer, geology, and well intake.

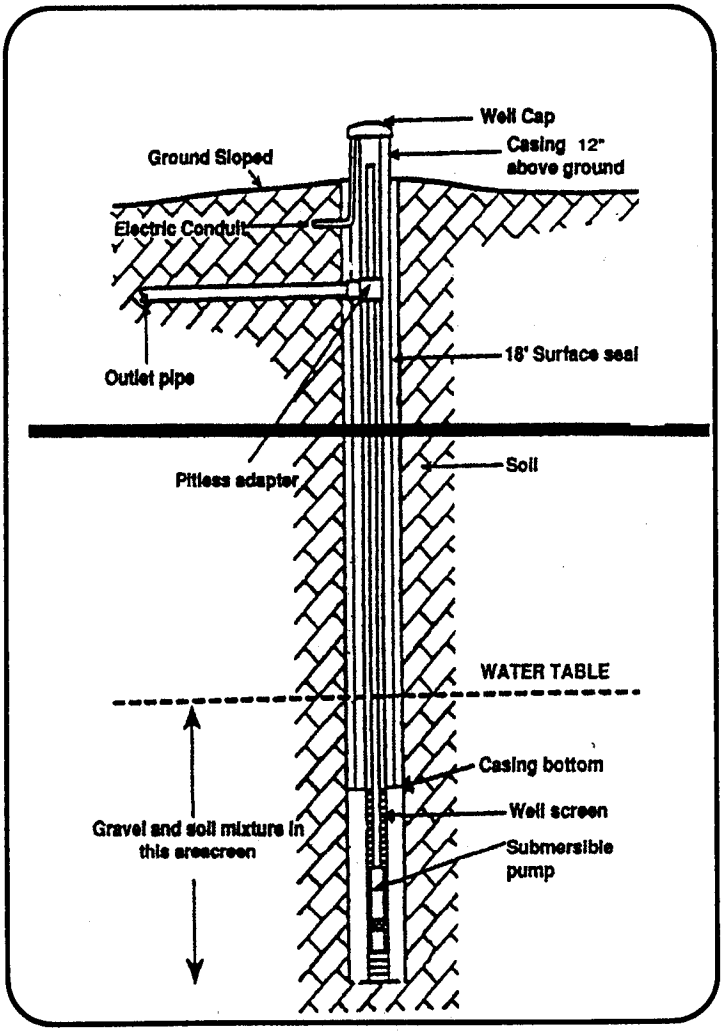

Figure 1: Required construction components for new wells.

2. Well construction

Proper well design reduces the risk of contamination by sealing the well from anything that might enter it from the surface (*Figure 1*). Poor design can allow a well to become contaminated by letting rain or snowmelt reach ground water without filtering through the soil. Wells located in pits, or constructed without grout or a sanitary well seal; can allow surface water to carry bacteria, pesticides, fertilizer, or petroleum products into your drinking water supply.

Several items concerning well construction that should be checked are described in the following sections. Well construction information may be available from the person who drilled your well, the previous owner, or the well construction report. The IDWR has copies of well construction reports (well logs) on file. You may contact any IDWR office in the state to request a copy. The location of your well, reported by township, range, section (1/4 of a 1/4 section or 40 acres), and the name of the person who the well was drilled for will be needed to locate your well log.

Well construction reports, for wells drilled prior to 1987, were not required to be filed with IDWR and therefore may not be readily available. The following overview of well construction and inspection can help you understand your drinking water contamination risk ranking. For more information, contact a well driller licensed by the state of Idaho, or any IDWR office in the state (see *Contacts and References* section).

Casing, grout, pitless adapter, and well seal

The well driller installs a steel pipe (casing) during construction to prevent collapse of the borehole. All openings in the casing should be sealed, and if water pipes exit through the side of the casing, they must do so through an approved fitting called a pitless adapter.

The space between the casing and the sides of the borehole provides a direct channel for surface water and contaminants to reach ground water. To seal off that channel, the driller fills the space with grout (cement, neat cement, or a special type of clay called bentonite). The grout seal should extend at least 18 feet in depth from the ground surface with the ground surface sloping away from the well in all directions. This will cause surface water to flow away from the well.

You can visually inspect the condition of your well casing for holes or cracks at the surface, or look down inside the casing with a light or mirror. If you can move the casing by pushing against it, you have a problem with your well casing's ability to keep out contaminants. Check on the condition of your well casing by listening for water draining down into the well (pump should not be running). If you hear water, there could be a crack or hole in the casing, or your casing does not extend down to the water level in the well. Either situation puts your drinking water source at risk.

To prevent contaminants from getting down inside the well casing, the driller installs a tight-fitting, vermin-proof well cap to prevent easy removal by children or entry of insects or surface water. Well regulations require a vermin-proof seal for all private wells (not all wells have caps; some may have pumping equipment attached at the surface). The cap should be firmly installed, with a screened vent incorporated into it so that air can enter the well. If your well has a vent, be sure that it faces the ground, is tightly connected to the well cap, and is properly screened to keep insects out. Check the well cap to see that it's in place and tightly secured. Electrical wires entering the well should be in an approved conduit.

Casing depth and height

As stated in Idaho Well Construction Standards Rules 25.02.a., all wells are required to have a durable, watertight casing that extends to a minimum depth of 18 feet below ground level. This ensures that water is filtered through soil and geologic materials before entering the well. Since most contamination comes from the surface, grouting along with casing the well deeper can provide greater protection, so you may want to consider exceeding the minimum casing depth.

Typically, the casing extends one to two feet above surrounding land to prevent surface water from running down the casing or on top of the seal and into the well. Idaho well regulations require that at least 12 inches of casing pipe extend above the final grade of the land. The siting of a well in areas that are subject to flooding is strongly discouraged. Check with IDWR for regulations concerning casing construction and minimum specifications.

Well age

If you have an older well, you may want to have it inspected by a licensed well driller. Older well pumps are more likely to leak lubricating oils, which can contaminate the ground water. In addition, older wells are also more likely to have a thinner casing that has corroded through. Even 30 to 40 year old wells with modern casings are subject to corrosion.

Well type

Dug wells may be at the highest risk for contamination. They are shallow and are often poorly protected from surface water. A dug well is a large-diameter hole, typically three to six feet wide, which is often constructed by hand and lined with rock, brick, or concrete. Hand dug wells as small as two feet and larger than 30 feet in diameter are known to exist. Dug wells will usually be 15 to 50 feet deep.

Driven-point (sand point) wells are constructed by driving assembled lengths of pipe into the ground. These wells are normally smaller in diameter (two inches or less) and less than 50 feet deep. They can only be installed in areas of relatively loose soils, such as sand.

All other types of wells, including those constructed by a combination of jetting and driving, are **drilled wells.** Depth will vary depending on the aquifer.

Well depth

Shallow wells which draw from the ground water nearest the land surface are generally more quickly affected by surface activities such as pesticide usage. Local geologic conditions determine how long it takes for this effect to happen. In some places, this process happens quickly -- in weeks, days, or even hours. Areas with thin soils over fractured bedrock or sand and gravel aquifers are particularly vulnerable to contamination. On the other hand, thick clay soils can prevent contaminants from reaching the water table.

3. Managing and maintaining existing wells

You wouldn't let a car or tractor run too long without an oil change, and likewise your well deserves the same attention. Good maintenance means testing the water every year, keeping the well area clean and accessible, keeping potential contaminants as far away as possible, and periodically having a qualified well driller check the well mechanics.

Better management of your existing well

Existing wells were most likely located according to traditional practice or regulations in place at the time of construction. While these wells may yet be producing potable water, you may want to consider how your well conforms to current standards and recommendations. Current standards can be found in the IDWR Well Construction Standards Rules and in the Idaho Guidelines for Non-Public Drinking Water Wells. Recommendations to better protect your drinking water supply can also be found within the *Homestead Assessment System* (**Home*A*Syst**), as well as other publications (consult the *Contacts and References* section).

Some ideas to consider are moving pesticide mixing, tank rinsing, or fuel storage further from your well. You might want to upgrade your well to include removing well pits, installing seals, or extending casings.

Changing the location of other practices may prove expensive (you can't move an animal lot or a silo overnight). Until you can meet minimum separation distances, you might change the way you manage such structures to control contaminants. For example, if your silo is too close to your well, you may want to install a system for collecting any drainage from freshly ensiled forage or install a diversion ditch to direct animal lot runoff away from the well (see *Fact/Worksheet 9, Improving Silage Storage,* for further information).

Provide some short-term manure storage as manure can contaminate your well with bacteria and/or nitrates. Locate storage areas on clay soil or, better yet, a concrete slab to reduce the chance of contaminating your drinking water. Also, protect these storage sites from rain and surface runoff (*see Fact/Worksheet 7, Improving Animal Manure Storage,* for further information).

The other **Home*A*Syst** fact sheets and worksheets provide more information on various potential contamination sources around your homestead. Several management practices you may want to consider to help maintain the quality of your well water include:

- Limit the use of petroleum products, solvents, or lawn and agricultural chemicals near your well.
- Protect wells from wastes stored or disposed of around the homestead.
- Protect wells from household wastewater treatment systems. Consider the possibility of upgrading or improving management of your current system.
- Move traffic areas and chemical or fuel storage areas away from the well.
- Limit the number of activities and structures located within 100 feet of your drinking water well. Increase this distance if you are working upgradient from your well.
- Inspect your septic system, septic tank, and all other tanks used with the system and drainfield to make sure it's operating properly at least once a year. If you think there are problems, call your local public health district or a licensed septic system repair company.

Backflow prevention and cross connections

Backflow or backsiphoning from pesticide mixing tanks allows chemicals to flow back into the well through the hose. Use an anti-backflow device when filling pesticide sprayer tanks to prevent the chemical mixture from flowing back into the well and contaminating ground water. Inexpensive anti-backflow devices for hoses used to fill farm sprayers may be available from irrigation or spray equipment suppliers. Provide an air gap of at least six inches between the hose and the top of the sprayer tank being filled. As an additional safety factor, pesticides should be added after the tank has been filled.

You may also want to consider purchasing an inexpensive plastic nurse tank. A nurse tank is filled with water at the well and then used to fill the sprayer away from the homestead and away from the well (for more information about preventing well contamination from pesticide mixing and loading practices, see *Fact/Worksheet 2, Pesticide Storage and Handling*).

Anti-backflow devices can be placed on all faucets with hose connections, and air gaps should be maintained between hoses or faucets and the water level during all activities. Otherwise, you risk having contaminated water from laundry tubs, sinks, washing machines, pressure washers, outside hydrants, livestock tanks, and swimming pools flowing back through the plumbing to contaminate your water supply. Water supplies that have cross-connections between them (connections between two otherwise separate pipe systems, such as potable and nonpotable) also put your drinking water at risk.

Although not required by state law, your county or city may mandate the use of backflow or backsiphoning prevention devices. Check with your local public health district for additional information.

Water testing

Keep an eye on water quality in existing wells by testing them annually. Although you can't have your water tested for every conceivable contaminant, some basic and inexpensive tests can indicate whether or not other problems exist. At a minimum, test your water annually for bacteria and nitrates using an Idaho certified laboratory or your local public health district. A good initial set of tests for a private well includes hardness, alkalinity, pH, conductivity, and chloride. If the well draws from sandy materials or granite bedrock, a test

for corrosives may be desirable.

You may choose to obtain a broad scan for a number of contaminants. Some labs offer a screening for metals, inorganic chemicals, volatile organic chemicals, and herbicides/ pesticides. These tests can be expensive, so you will probably not have them done unless you suspect a specific problem.

When testing for additional contaminants, be sure to select contaminants that are most likely present at your homestead. For example: test for lead if you have lead pipes or soldered copper joints; test for volatile organic chemicals (VOCs) if there has been a nearby use, spill or deposit (in dump or landfill) of oil, petroleum, or solvent.

While testing for pesticides can be very expensive (often $80-200 per analysis), the expense may be justified if:

- Your well has nitrate levels greater than 10 mg/L (reported as nitrate-nitrogen, NO_3-N) or 44 mg/L (reported as nitrate, NO_3).
- A pesticide spill or back-siphoning has occurred near the well.
- Your well is shallow or is located in sandy soil and down slope from irrigated cropland where pesticides are used.

You can seek further advice on appropriate water tests from your local public health district or county Cooperative Extension System office.

You should test your water more frequently if:

- There are unexplained illnesses in the family.
- There are individuals who may be at increased risk like infants and pregnant or nursing women.
- There are noticeable changes in livestock or poultry performance.
- Your neighbors find a particular contaminant in their water.
- You note a change in water taste, odor, color, or clarity.
- You have a spill or back siphon of chemicals or petroleum products near your well or on your homestead.
- You or your neighbor apply chemicals or manure to fields within 100 feet of your well.
- Your animal operation inspectors require it.

You can have your water tested by a commercial laboratory. A list of Idaho certified labs is available from your county Cooperative Extension System office or local public health district. Follow the lab's instructions for water sampling to assure accuracy of the results. Use only the container provided and return samples promptly. Bacteria sample bottles are sterile and must be returned to the lab within specified time limits. **Request that drinking water methods be used to test your water.**

Because many materials, including bacteria and nitrate-nitrogen, naturally occur in minor amounts in ground water and levels can vary seasonally, you may want to contact a specialist for help in interpreting test results. Contact your local public health district or Idaho Department of Health and Welfare-Division of Environmental Quality (IDHW-DEQ) office in your area for assistance. Several Cooperative Extension System and DEQ publications may be of help as well (see *Contacts and References* section).

Nitrate and bacteria are acute contaminants, which means that the health effects are more immediately felt. Nitrate levels greater than 10 mg/L should not be consumed by infants under one year of age. The standard bacteriological test conducted on drinking water supplies is the test for total coliforms. If any bacteria are detected in a water system, re-sample the system. If a presence is confirmed by the second test, well owners should take action to correct the problem, i.e., disinfection. The presence of total coliforms is an indicator of system vulnerability. If a presence is detected in any bacterial analysis, the lab will automatically test for the presence of fecal coliforms.

The presence of fecal coliforms is a more serious matter since it indicates that the well is vulnerable to contamination by fecal material and may also contain other pathogens as well. There is no acceptable level for fecal coliform contamination. If fecal coliforms are present, the water does not meet drinking water standards.

Keep in mind that activities off of your property can also affect your ground water. Chemical spills, changes in land use, underground storage tanks, and the presence of landfills can increase the chance of contaminants getting into your water. Bacteria and nitrates are two important indicators which may suggest problems with the well's location or construction, and at excessive levels, can cause health problems. If your water has a high nitrate or bacteria level, you may want to talk with a specialist about the need for additional testing, disinfection, or other treatment.

It is also important to record test results and to note changes in water quality over time. In addition to water analysis test results, you should keep records of a few other things. These include well construction details, results of maintenance for the well and pump, and dates that these activities are done.

Well maintenance

Well equipment doesn't last forever. From time to time, your well may require attention to its mechanical parts. Well maintenance also includes protecting your well from contamination sources.

4. New wells

New wells are expensive, but they are a good investment for the future. Getting the most from such an investment means locating the well away from contamination sources and working to maintain the quality of the well. Some simple principles are:

- Follow at least the required minimum distances from potential contamination sources that are set by your local public health district, as well as any other local ordinances, when locating your new well (see *Contacts and References* section).
- Locate your well on ground higher than contamination sources such as fuel tanks, livestock lots, septic systems, or pesticide mixing areas. Where practical, locate the well as far as possible from contamination sources. There is no specific distance from a potential contamination source that will guarantee the well will not be affected.
- Build soil up around the well so that all surface water drains away from it, but maintain the minimum 12 inches of casing above the soil surface.
- Avoid areas that are prone to flooding.
- Make the well accessible for pump repair, cleaning, testing, and inspection.
- Hire a competent, licensed well driller. Make sure the driller disinfects the well with chlorine after construction, tests the water for bacteria after drilling, and provides a copy of the water well record, which includes detailed information about the well depth and construction.

5. Unused wells

Many rural homesteads have unused wells. It is not uncommon to visit a homestead and find three or four wells, with only one or two currently in use. No one knows how many of these wells are in Idaho, although estimates range in the thousands.

If not properly filled and sealed, these wells can provide a direct conduit for surface water carrying contaminants to enter ground water without filtering through soil or can allow contaminant movement from one aquifer to another.

In addition to these wells being a threat to ground water, large open wells pose safety hazards for people and animals. The landowner, under Idaho law, is responsible for properly abandoning wells and test holes.

You may perform proper well abandonment work on your own land or an Idaho licensed well driller can also be hired to close these wells. Regardless of who does the work, the minimum regulatory requirements must be met. A local well driller can be helpful because they will have experience with well construction materials and methods as well as a working knowledge of the geology of the well site. In addition, special equipment is often required to remove old pumps and piping and to properly install sealing material inside the well. Use of inappropriate materials and methods can lead to well settling, collapse, and continued ground-water contamination.

Locating unused wells

Pipes sticking out of the ground around the homestead or under an old windmill are the most obvious places for finding unused wells. You may not know the history of your property, however, and old well locations may not be obvious. A depression in the ground may indicate an old well. Also, wells were often drilled in basements of houses, under front steps, or near old cisterns.

Proper well abandonment

The IDWR administers the laws regulating the abandonment of wells. Well drillers and landowners are required to follow these laws so that the potential for aquifer contamination can be reduced.

Proper well closing takes time and money. Costs will vary with the well depth, diameter, and geology of the area. However, spending a few hundred dollars to properly abandon an old well near your home may prevent contamination of your drinking water. Please contact the IDWR in your area for additional information.

Worksheet 1

Drinking Water Well Condition: Assessing Drinking Water Contamination Risk

1. Use a pencil. You may want to make changes.
2. For each category listed on the left that is appropriate to your homestead, read across to the right and **circle** the statement that **best** describes conditions on your homestead (skip and leave blank any categories that don't apply to your homestead.
3. Then look above the description you circled to find your "rank number" (4, 3, 2, or 1) and enter that number in the blank under "your rank."
4. Complete the section "What do I do with these rankings?"
5. Allow about 15-30 minutes to complete the worksheet and summarize your risk rankings for well management practices.

	LOW RISK (rank 4)	LOW-MOD RISK (rank 3)	MOD-HIGH RISK (rank 2)	HIGH RISK (rank 1)	YOUR RANK
WELL LOCATION *(Addressed in Section 1)*					
Position of drinking water well in relation to contamination sources	Up slope from all potential sources of contamination. No surface water runoff reaches well. Surface water diverted from well.	Up slope from or at grade with potential sources of contamination. No surface water runoff reaches well.	Down slope from most potential sources of contamination. Some surface water runoff may reach the well.	Settling or depression near casing. Surface water runoff reaches the well.	____
Separation distances between well and homestead contamination sources*	All potential sources of contamination are greater than the recommended separation distances from the well.	Most potential sources of contamination meet the recommended minimum separation distances from the well.	Some potential sources of contamination meet the recommended minimum separation distances from the well.	None of the potential sources of contamination meet the recommended minimum separation distances from the well.	____
Soil (≤ 5' below ground surface) potential to protect ground water	Fine-textured soils (clay loams, silty clay).	Medium-textured soils (silt loam, loam).	Medium textured soils.	Coarse-textured soils (sands, sandy loam).	____
Geology (≥ 5' below ground surface) potential to protect ground water	____	Clay layers present above the water bearing zones.	Clay layers absent above the water bearing zones.	Fractured consolidated formations such as basalts	____

*See page Fact/Worksheet 1, page 4, *Drinking Water Well Condition*, Separation Distances.

	LOW RISK (rank 4)	LOW-MOD RISK (rank 3)	MOD-HIGH RISK (rank 2)	HIGH RISK (rank 1)	YOUR RANK
WELL CONSTRUCTION* *(Addressed in Section 2)*					
Condition of casing, well cap, and pitless adapter	No holes or cracks in casing. An approved sanitary well cap tightly secured. Screened vent. Pitless adapter in place.	No defects visible. Approved sanitary seal tightly secured. Well vented but not screened.	No holes or cracks visible. Cap loose.	**Cap missing or loose.** No pitless adapter. **Holes or cracks visible. Can hear water draining.**	____
Casing depth and surface seal	Casing extends below water level in well and is more than 18 feet below surface. At least 18 feet of surface seal is in place, or into the confining layer above the aquifer in which the well is completed.**	Casing extends to water level, but not less than 18 feet below surface. Required 18-foot surface seal is in place.**	**Surface seal missing or less than required depth.****	**No surface seal.****	____
Casing height above land surface	More than 12 inches above grade. No flood water reaches well.	12 inches above grade. Possibility of flood water reaching well.	**Less than 12 inches above grade.** Possibility of flood water reaching well.	**Below grade or in pit or basement. Likely to be flooded.**	____
Well age	Constructed following Idaho well guidelines, enacted 1987.	____	Constructed and seal is placed before 1987.	Not constructed according to Idaho regulations.	____

Boldface type: Besides representing a higher-risk choice, this practice also violates Idaho law.

*See page 5 of *Fact/Worksheet 1* for well construction requirements in Idaho.
**An 18 foot surface seal is required for all new well installations. Existing wells must meet requirements in effect at time of construction. Placement of a surface seal in all wells is required.

The Homestead Assessment System is a cooperative project developed, coordinated, and supported by the following agencies and organizations:

Idaho Association of Soil Conservation Districts (IASCD)
Idaho Department of Agriculture (IDA)
Idaho Department of Health and Welfare-Division of Environmental Quality (IDHW-DEQ)
Idaho Department of Water Resource (IDWR)
Idaho Public Health Districts
Idaho Soil Conservation Commission (SCC)
Idaho Water Resources Research Institute (IWRRI)
University of Idaho-Cooperative Extension System (CES)
USDA-Farm Service Agency (FSA)
USDA-Natural Resources Conservation Service (NRCS)
USDA-Rural Economic and Community Development (RECD)
U.S. Environmental Protection Agency (EPA)

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Information derived from **Home*A*Syst** worksheets is intended only to provide general information and recommendations to rural residents regarding their own homestead practices. All results are confidential.